

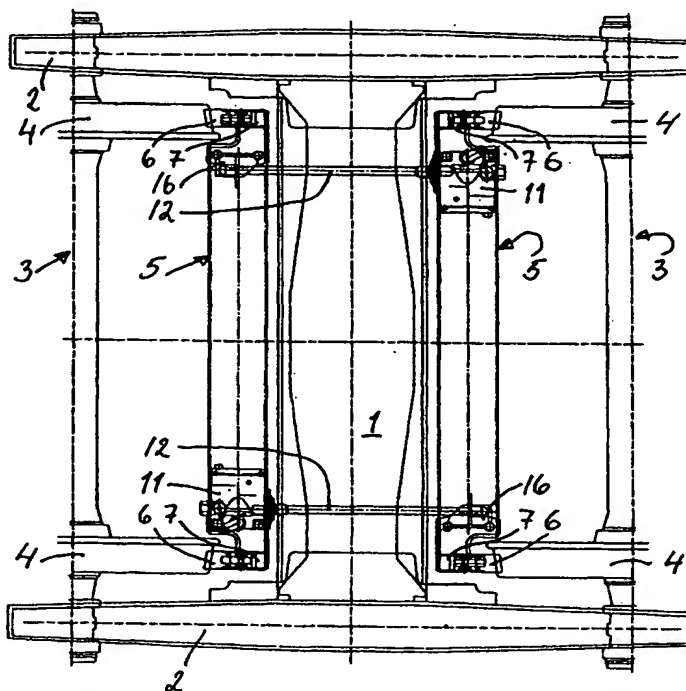


## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/SE99/01252 <b>(22) International Filing Date:</b> 12 July 1999 (12.07.99) <b>(30) Priority Data:</b> 9802514-1 13 July 1998 (13.07.98) SE <b>(71) Applicant (for all designated States except US):</b> SAB WABCO AB [SE/SE]; P.O. Box 515, S-261 24 Landskrona (SE). <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only):</b> EMILSSON, Fred [SE/SE]; Villa Solhem, Stora Slågarp, S-231 95 Trelleborg (SE). <b>(74) Agents:</b> STRÖM, Tore et al.; Ström & Gulliksson AB, P.O. Box 4188, S-203 13 Malmö (SE).		<b>(81) Designated States:</b> AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i>

**(54) Title:** A BOGIE BRAKE**(57) Abstract**

A rail vehicle bogie comprises a transverse bolster (1), two side frames (2) and two wheel sets (3) with wheels (4). A bogie brake comprises between the two wheel sets two transverse brake beams (5) arranged to be pressed apart by brake actuators (11) for braking engagement by brake blocks (6) at the ends of the brake beams with the treads of the wheels. According to the invention the brake actuators (11) are arranged in the brake beams (5) close to the wheels (4) and are integrated in the beams, which otherwise are built-up of plate profiles (15).



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**A BOGIE BRAKE**

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**Technical Field**

The present invention relates to a bogie brake for arrangement in a rail vehicle bogie, which comprises a transverse bolster, two side frames connected to the  
10 bolster via springs, and two wheel sets, each having two wheels and being journalled for rotation in the side frames,

the bogie brake comprising between the two wheel sets two transverse brake beams arranged to be pressed apart by  
15 fluid actuated means for braking engagement by brake blocks at the ends of the brake beams with the treads of the wheels.

**Background of the Invention**

Bogie brakes of the kind defined above are well known  
20 in the art and have been in commercial use for many years, especially for goods waggons in USA. Typical examples of prior bogie brakes are shown in US-A-3 088 550, 3 731 766, 4 434 877, and 5 069 312. The brake beams for these bogie brakes have traditionally been heavy and clumsy con-  
25 tructions with a high degree of inherent stiffness and a capability of transferring high bending moments from the brake actuators, most often centrally located in the brake beams, to the brake blocks at their ends. The brake actuators have been mounted external to or between the  
30 beams, adding to the overall weight.

The main object of the invention is to attain a bogie brake with a markedly reduced weight and space requirement in relation to conventional designs without sacrificing the ability to transmit the requisite brake forces to the wheel  
35 treads via the brake blocks.

### The Invention

This is according to the invention attained in that brake actuators are arranged in the brake beams close to the wheels and are integrated in the beams, which otherwise  
5 are built up of plate profiles, which in different embodiments for example may be U-shaped or Z-shaped.

Also attachments for push rods from the brake actuators in the respective opposite brake beams are preferably incorporated as construction parts of the brake  
10 beams.

Hereby, the force from each brake actuator is only to be transferred the small distance to the brake block, so that the bending moment in the beams is kept at a minimum and accordingly also the dimensional requirement on the  
15 beams. It is also of great advantage that the brake actuators (and push rod attachments) are incorporated in the brake beams.

The brake actuators used in the bogie brake according to the invention are preferably commercially available  
20 brake units including slack adjusters or brake regulators, so that the necessary slack adjusting function is taken care of by the brake actuators. The used brake unit has a parallelepipedical shape, which makes it extremely suitable for incorporation in the brake beams of the kind described.

25 Conventional brake beams are supported at their ends by guides in the side frames, which means that the bogie brake, i.e. the brake beams with their brake actuators and associated parts, is unsprung. According to the invention a brake block holder at each end of each brake beam is  
30 provided with a suspension link for pivotal suspension of the beam from the bolster, which means that the bogie brake is sprung with the advantages associated therewith.

Each suspension link is preferably provided with a friction device known per se for keeping the brake beams in  
35 a proper position. The friction devices are also able to

act as resilient and damping means for the transverse or lateral movements of the brake beams.

The brake block holders are integrated parts of the brake beams.

5       **Brief Description of the Drawings**

The invention will be further described below under reference to the accompanying drawings, in which the different figures are drawn to different, suitable scales and in which

10       Fig 1 is a plan view of a rail vehicle bogie provided with a bogie brake according to the invention,

Fig 2 is a front view of the bogie brake according to Fig 1,

15       Fig 3 is a schematical side view of the bogie of Fig 1 with the bogie brake,

Fig 4 corresponds to Fig 3 but with certain bogie parts omitted for the sake of clarity,

Fig 5 is a front view corresponding to Fig 2 of a bogie brake provided with a parking brake arrangement,

20       Fig 6 is a plan view of the arrangement of Fig 5,

Fig 7 is a plan view of a bogie brake provided with a slightly different parking brake arrangement,

Figs 8-10 are plan views of bogie brakes with three different types of brake units incorporated therein,

25       Figs 11 and 12 are a front view and a plan view, respectively, of a slightly modified bogie brake according to the invention,

30       Figs 13-15 are a front view, a side view and a plan view, respectively, of a brake beam for incorporation in the bogie brake of Figs 11 and 12, and

Fig 16 is a side view to a larger scale of an embodiment differing from the other embodiments mainly in the shape of the brake beam profiles.

### Description of Practical Embodiments

The different Figures are different views of the same constructions with possible modifications. For the sake of clarity reference numerals are used relatively sparingly and generally speaking mainly in Figures where the referenced part first appears.

A rail vehicle bogie shown in Fig 1 comprises a bolster 1 for rotatable connection to a body (not shown) of the rail vehicle, two side frames 2 connected to the bolster 1 via springs (not shown), and two wheel sets 3 journaled for rotation in the side frames 2. Each wheel set 3 is provided with two wheels 4.

A so called bogie brake for such a bogie has - as is well known in the art - two transverse brake beams 5 suspended between the two wheel sets 3 and arranged to be pressed apart for braking engagement - by brake blocks 6 provided at the ends of the brake beams - with the treads of the wheels 4.

Each brake block 6, which is worn-out after a number of brake applications and has to be replaced, is releasably attached to a brake block holder 7 with a design to be described below. Each such brake block holder 7 is provided with a suspension link 8, which is pivotally suspended from a suspension bracket 9 on the bolster 1, so that the brake beams 5 are suspended from a sprung part. The brake block holders 7 and thus the brake beams 5 are held in a proper suspended position in relation to the suspension links 8 by means of conventional friction devices 10. These friction devices 10 also act as resilient and damping means for the transverse or lateral movements of the brake beam 5.

The brake beams 5 are provided with two conventional brake units 11. A push rod 12 of each brake unit 11 is connected to the opposite brake beam 5, so that the two brake beams thus are pressed apart at the application by compressed air of the brake units. The push rods 12 extend

through or under the bolster 1. The brake units 11 may have a diagonal arrangement, as is for example shown in Fig 1, or may both be arranged in the same brake beam 5, as is shown in Fig 6.

5       The brake unit 11 used in the present instance is a conventional unit, which is widely used especially for normal block braking. It has a parallelepipedical shape and is well suited to be arranged in a brake beam 5, which has a design to be described below. Besides a cylinder/piston-  
10 arrangement it contains a slack adjuster or brake regulator, as is well known in the art.

As appears from Figs 8-10, the brake unit 11 may be a standard unit, Fig 8, a unit with a mechanical parking brake lever 13, Fig 9, or a unit with a spring parking  
15 brake 14, Fig 10.

As for example appears from Fig 4, each brake beam 5 is mainly composed of two generally U-shaped plate profiles or brake beam halves 15, and the brake unit 11 bolted thereto constitutes an integral part thereof. The brake  
20 beam construction is also shown quite clearly in Figs 13-15, which - like Figs 11 and 12 - show a variant where the brake block holders 7 are integrated parts of the brake beams. Two halves 15 with a brake unit 11 and a push rod attachment 16 (Fig 1) together form a brake beam 5.

25       In that brake beam 5 the brake unit 11 is arranged as close to the brake block holder 7 as possible, which means that the bending moment transmitted to the beam 5 at a brake application is as low as possible, so that the material thickness and thus the weight of the beam can be  
30 kept at a minimum.

The normal construction of the brake beams 5 is that illustrated in for example Figs 1, 2 and 6, where the brake beam end including the brake block holder 7 is a pre-fabricated end unit 17 (Fig 2), which preferably is

attached to the brake beam halves 15 by the same bolts as the brake unit 11 and the push rod attachment 16.

Two mechanical parking brake arrangements are illustrated in Figs 5, 6 and Fig 7, respectively. In both  
5 cases the respective brake unit 11 is provided with a parking brake lever 13.

In the first arrangement according to Figs 5 and 6 the two brake units 11 are mounted in the same brake beam  
5. A wire 18 is attached to each parking brake lever 13 and  
10 may extend over a pulley 19 to for example a parking brake wheel (not shown) at the end of the vehicle. As hereby the reaction forces at a parking brake application are taken up by the brake beam suspensions, the parking brake is not  
affected by the movement of the beam, for example due to  
15 brake block wear.

In the second arrangement according to Fig 7 the two brake units 11 are mounted diagonally, one in each brake beam 5. Wires 18 extend from the brake levers 13, in one case over a pulley 19, and leave the bogie in parallel.  
20 They can be connected to a parking brake wheel at the end of the vehicle.

Fig 16 shows a presently preferred embodiment. The wheel 4, the brake block 6, the brake block holder 7, the suspension link 8, the suspension bracket 9, and the brake  
25 unit 11 can be recognized from other Figures, although the specific design of the different parts may be dissimilar from that of other embodiments. However, the most important difference relating to the invention is the shape of the brake beam plate profiles, which here has the reference  
30 numeral 20. These profiles 20 are in this embodiment namely Z-shaped (instead of U-shaped in the other embodiments).



## CLAIMS

1. A bogie brake for arrangement in a rail vehicle bogie, which comprises a transverse bolster (1), two side frames (2) connected to the bolster via springs, and two  
5 wheel sets (3), each having two wheels (4) and being journalled for rotation in the side frames (2),

the bogie brake comprising between the two wheel sets (3) two transverse brake beams (5) arranged to be pressed apart by fluid actuated means (11) for braking engagement  
10 by brake blocks (6) at the ends of the brake beams with the treads of the wheels (4),

c h a r a c t e r i z e d in that brake actuators (11) are arranged in the brake beams (5) close to the wheels (4) and are integrated in the beams, which otherwise  
15 are built-up of plate profiles (15; 20).

2. A bogie brake according to claim 1, c h a r a c-  
t e r i z e d in that the plate profiles (15) are U-shaped.

3. A bogie brake according to claim 1, c h a r a c-  
20 t e r i z e d in that the plate profiles (20) are Z-shaped.

4. A bogie brake according to claim 1, c h a r a c-  
t e r i z e d in that attachments (16) for push rods (12) from the brake actuators (11) in the respective opposite  
25 brake beam (5) are incorporated as construction parts of the beams.

5. A bogie brake according to claim 1, c h a r a c-  
t e r i z e d in that each brake actuator (11) is a parallelepipedical brake unit including a slack adjuster or  
30 brake regulator.

6. A bogie brake according to claim 1, c h a r a c-  
t e r i z e d in that a brake block holder (7) at each end of each brake beam (5) is provided with a suspension link  
(8) for pivotal suspension of the beam from the bolster  
35 (1).

7. A bogie brake according to claim 6, c h a r a c-  
t e r i z e d in that the suspension link (8) is provided  
with a friction device (10) known *per se* for keeping the  
brake beam (5) in a proper position.

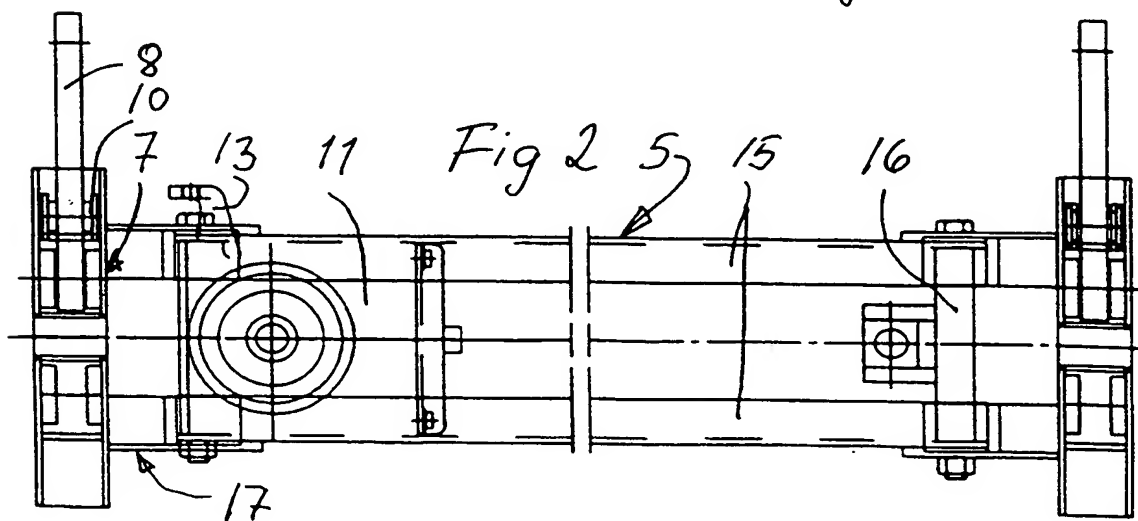
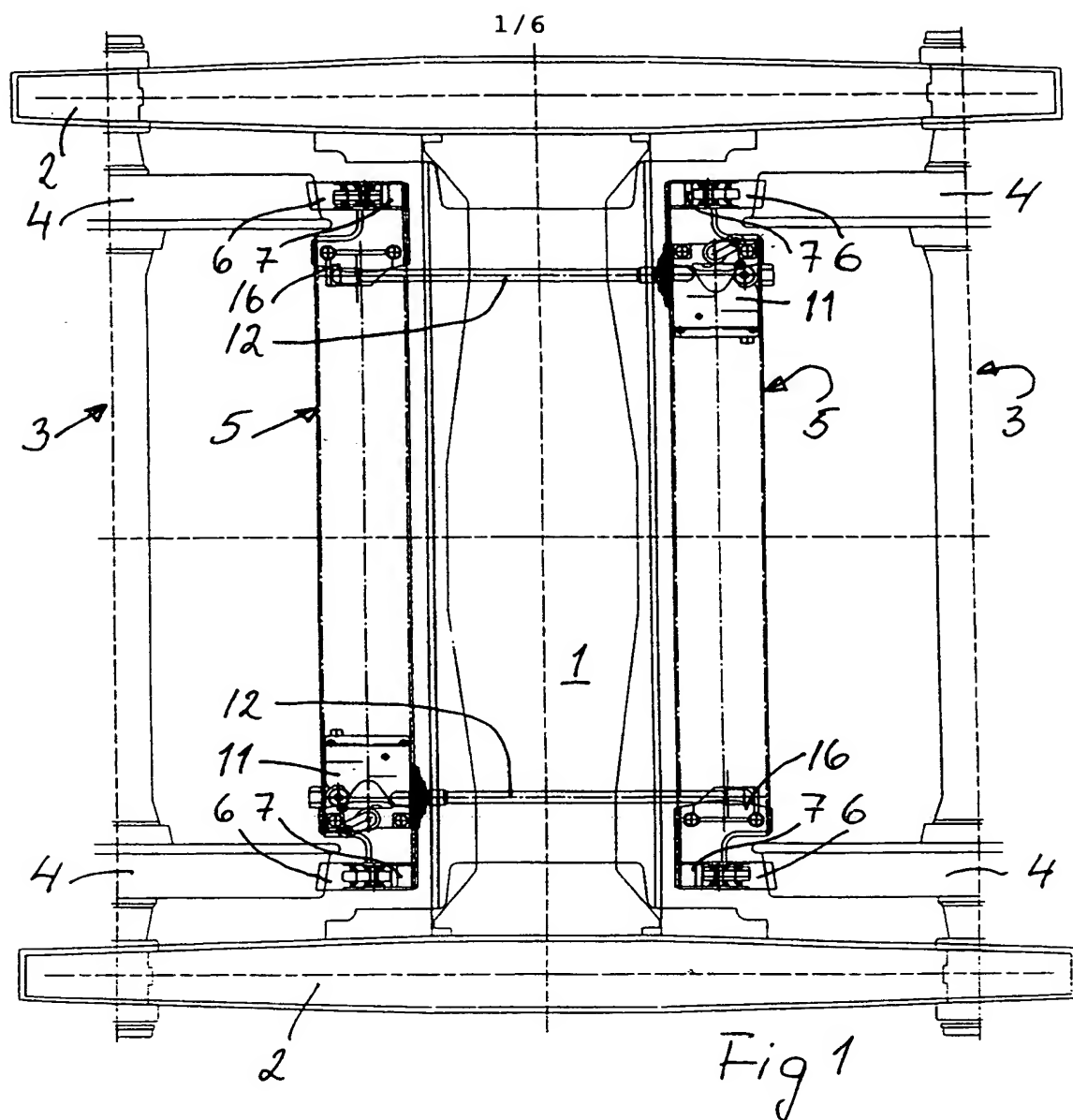
5 8. A bogie brake according to claim 1, c h a r a c-  
t e r i z e d in that each brake actuator (11) is provided  
with a parking brake lever (13) for connection via a wire  
(18) to a parking brake wheel or the like on the vehicle.

10 9. A bogie brake according to claim 1, c h a r a c-  
t e r i z e d in that the brake block holders (7) for  
holding the brake blocks (6) are integrated parts of the  
brake beams (5).

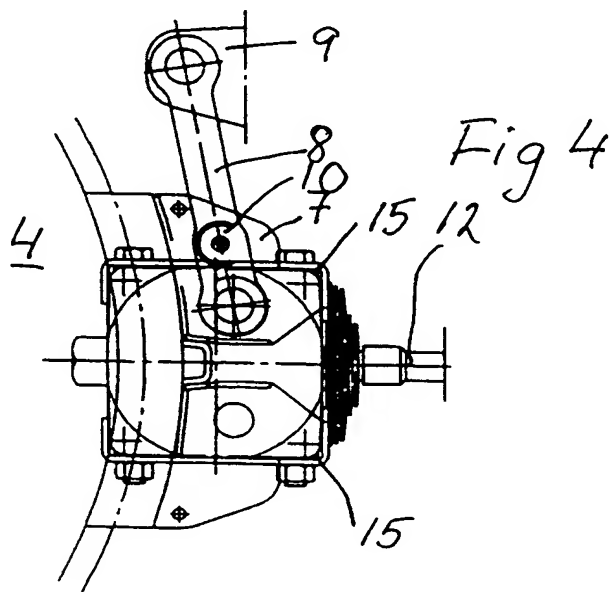
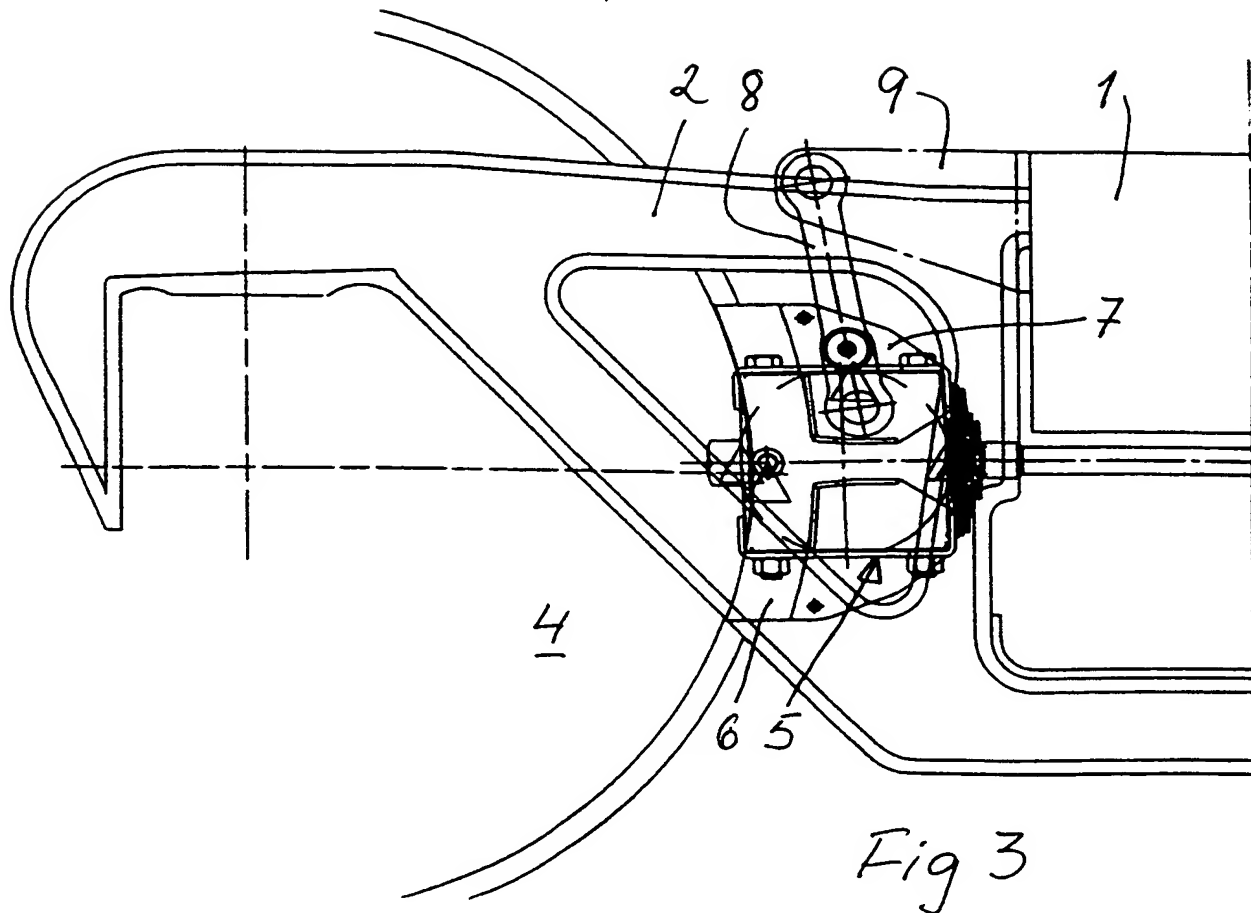
15 10. A bogie brake according to claim 9, c h a r a c-  
t e r i z e d in that each brake block holder (7) is built  
as a unit bolted to the brake beam plates (15).

11. A bogie brake according to claim 10, c h a r a c-  
t e r i z e d in that the brake block holder (7) is  
attached to the brake beam plates (15) by the same holes as  
the brake actuators (11).

20 12. A bogie brake according to claim 9, c h a r a c-  
t e r i z e d in that each brake block holder (7) consists  
of two halves, each integral with a brake beam plate (15).



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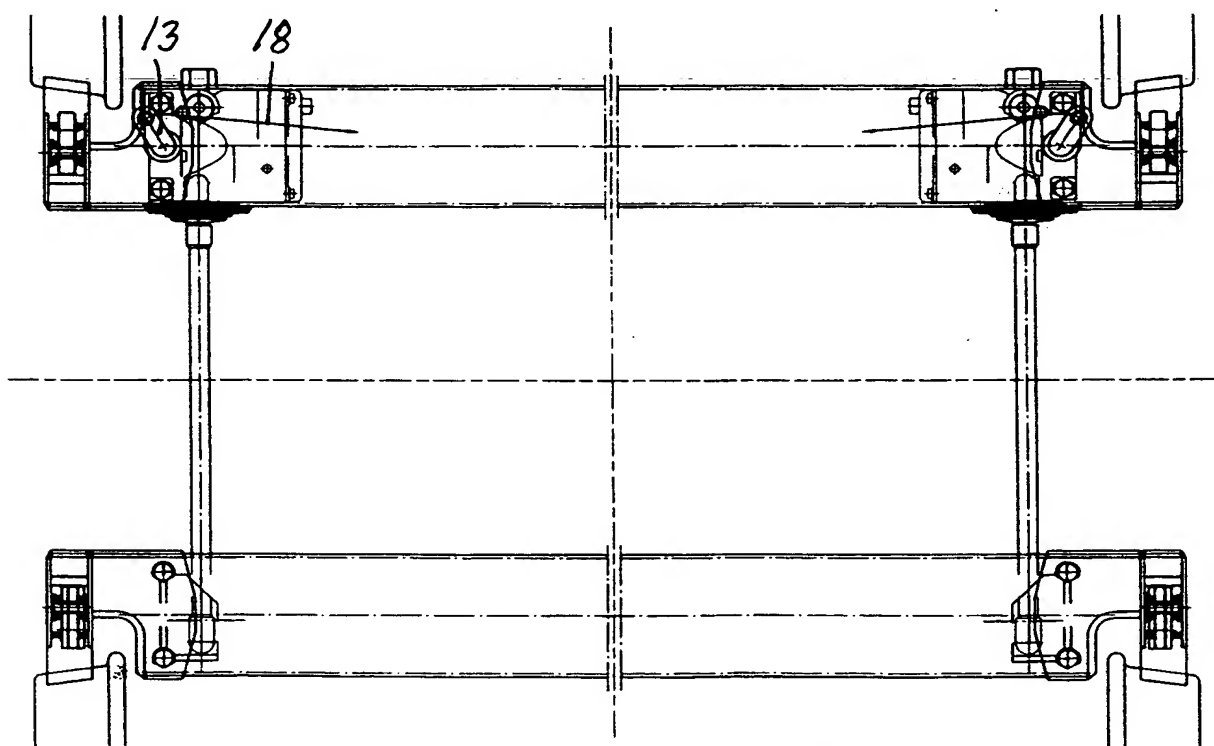
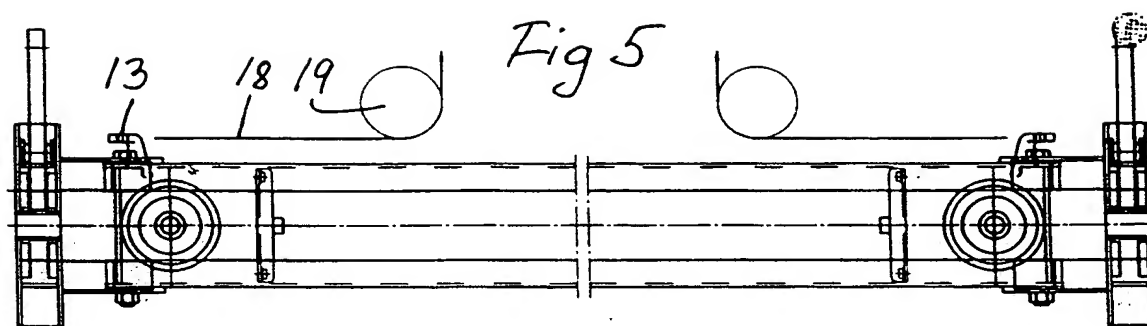


Fig 6

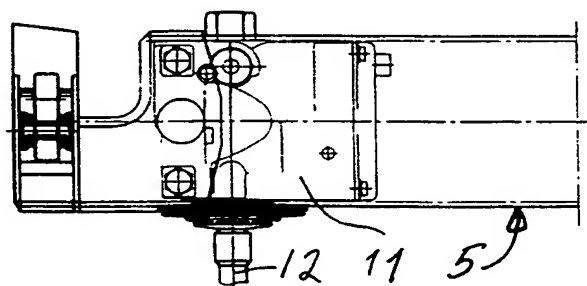
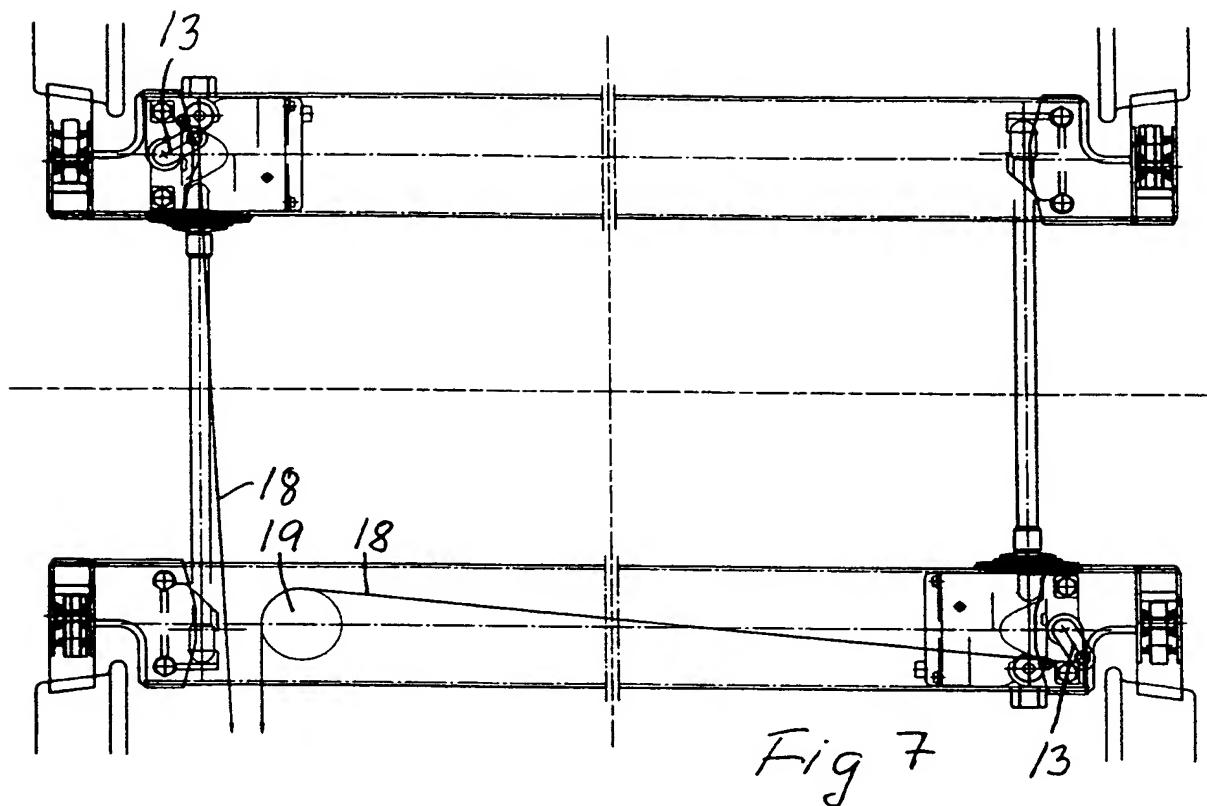
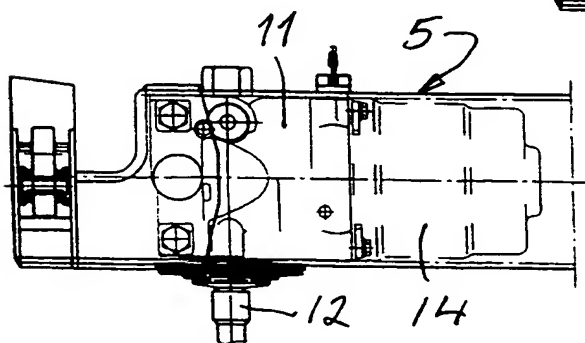
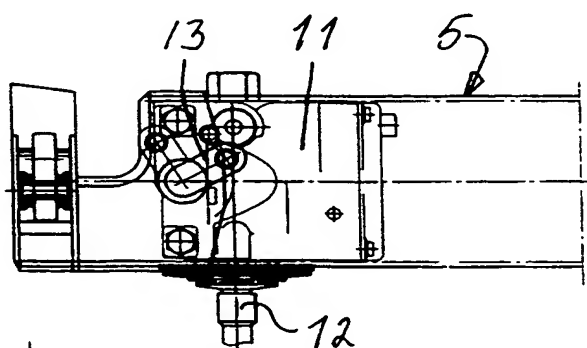
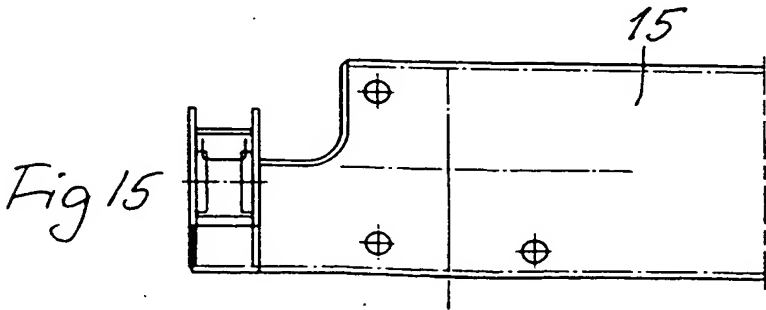
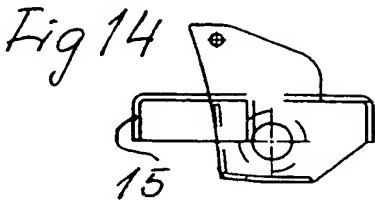
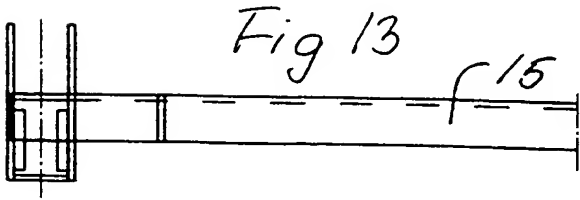
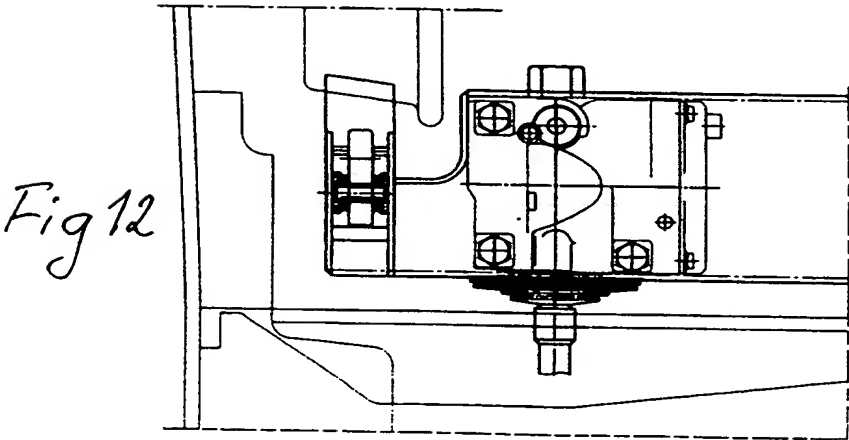
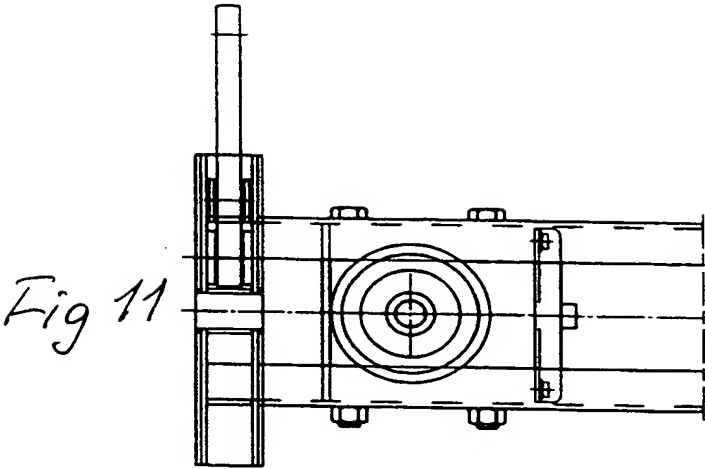
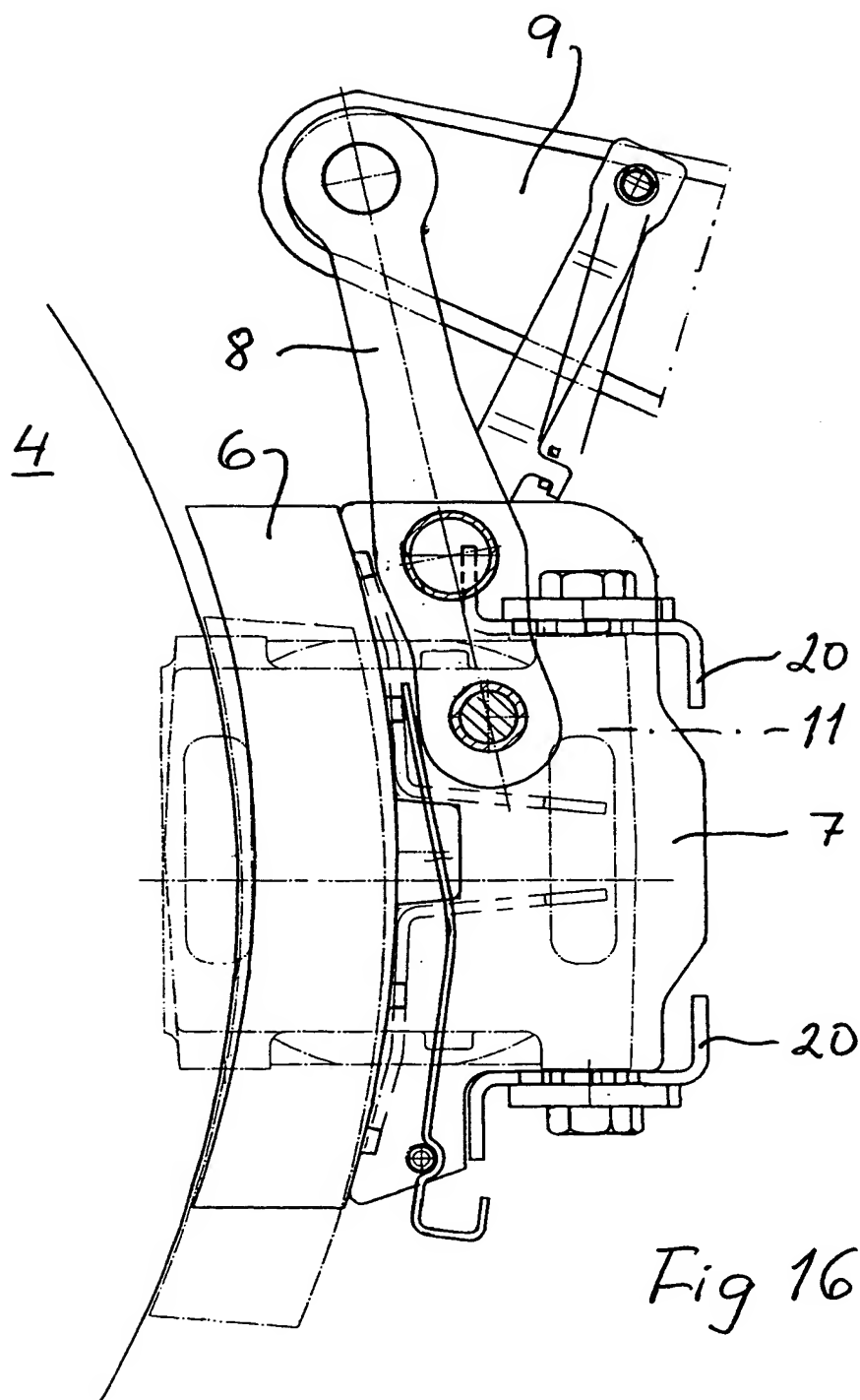


Fig 8









## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 99/01252

## A. CLASSIFICATION OF SUBJECT MATTER

IPC6: B61H 1/00, B61H 13/34 // B60T 1/04

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## B. FIELDS SEARCHED

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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## C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Date of the actual completion of the international search

7 October 1999

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Swedish Patent Office  
Box 5055, S-102 42 STOCKHOLM

Facsimile No. +46 8 666 02 86

Authorized officer

Åke Olofsson / MR

Telephone No. +46 8 782 25 00

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## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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